
SECTION III - RECAPITALIZATION

Readiness can only be sustained into the future with a recapitalization program that delivers adequate numbers of technologically superior platforms and systems to the Fleet. Emergence from the Cold War as the sole global Naval superpower permitted a decade of greatly diminished investment, and a period of industrial, technological, and economic reorganization. The Department is now poised to enter a new millennium with a focused and expanding investment program to secure Naval superiority well into the 21st Century. Of particular note, this budget makes significant headway against ship construction backlog, building to a new construction quantity of nine in FY 2005. The total request for procurement funding has increased from \$19.5 billion in FY 1998 to \$22.0 billion in FY 2000.

At the same time, every avenue which results in cost reduction or acquisition savings must be explored. To improve the way the Navy and Marines fight, work, and live, several capital improvements have been added to the FY 2000 budget which will result in significant ownership cost reductions. These initiatives (termed "Smart Work") are evident throughout the investment accounts. This budget also

... pursue a focused modernization effort

reflects the Department's continued commitment to incorporate, where appropriate, savings from Acquisition Reform. Acquisition reform savings include resources saved through the use of performance specifications vice military specifications, and cost avoidance attributable to reduced test requirements through modeling and simulation or early industry involvement in the design process. The Department continues to request authority for multiyear procurement as described in the ship and aircraft sections which follow. The use of multiyear procurement not only achieves planned acquisition savings but contributes to the stability of the multiyear programs, thus achieving cost avoidances. Additional acquisition reforms comprise a plethora of initiatives such as contractor incentives, cost-as-an-independent-variable, reduced oversight through statement of work modifications and increased contractor total-system-integration responsibility. Wherever possible, savings from Smart Work initiatives, as well as from acquisition reform efforts, have been folded back into the procurement accounts in an effort to increase the level of recapitalization.

We continue attempts to offset the cost of modernization through participation in combined weapons and systems development and acquisition programs, through cooperative ventures and symposia, and a number of project-oriented systems development working agreements. Many of these are listed in the following table. Such arrangements result in shared weapon and systems development costs, reduced weapon and system procurement costs, technology

sharing and leveraging, and stronger military and industrial alliances in support of national goals.

<u>Selected International Acquisition Programs</u>	<u>Countries</u>	(In millions)		
		<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
<i>Research and Development</i>				
NATO Cooperative R&D	Various	5.1	6.4	2.5
International Cooperative RDT&E	Various	2.5	1.1	2.0
Vector	Germany, Sweden	.4	7.5	7.4
HARM Modifications	Germany, Italy	4.9	7.1	11.3
Ship Self Defense	Various	66.2	51.5	18.7
ICR Engine	United Kingdom	29.5	33.6	17.7
<i>Procurement</i>				
AV-8B	Spain, Italy	299.2	338.8	291.3
NULKA	Australia	15.3	20.6	17.2
ESSM	NATO and other allies	10.3	12.9	11.7
ITALD	Israel	.3	8.3	0
Rolling Airframe Missile (RAM)	Germany	98.5	97.6	78.2
T-45TS	United Kinadom	282.6	300.2	335.0

Note: The above amounts represent the DON program costs; this list is not all inclusive.

The Navy is also pursuing, consistent with Congressional approvals, ship sales and transfers to foreign governments. These partnerships serve the United States in two ways: by preserving through allied Navies the military utility of older but still capable platforms; and by generating U.S. government revenues to offset the burden of global leadership.

SHIP PROGRAMS

Surface Programs

Surface ship programs remain the backbone of National Defense, projecting the Nation's power to the farthest reaches of the globe. Consistent with this vision, the Department's FY 2000 budget reflects funding which emphasizes the acquisition, modernization, and recapitalization of the world's preeminent surface fleet.

Advance procurement of materials continues in FY 2000 for the last Nimitz-class aircraft carrier, CVN-77. CVN-77 is also the foundation of the evolutionary approach towards the next generation aircraft carrier (CVX) and will incorporate transition technologies consisting of an integrated island design, propulsion plant improvements, improved design tools, and manpower /material support initiatives. Continuing the evolutionary approach, R&D efforts for CVX continue in FY 2000. This approach will provide the means to develop, design and deliver the centerpiece of the Navy's Battle Groups for the 21st century. Additionally, FY 2000 contains

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advance procurement of materials for the refueling overhaul of USS Eisenhower (CVN-69) (fully funded in FY 2001).

The Arleigh Burke class of guided missile destroyers, the cornerstone of the current surface combatant force, continues with the third year of a multiyear procurement program. The Navy has committed to the acquisition of a total of 13 ships over the 1998-2001 period, and will complete the program with 6 more in FY 2002-2003. Recapitalization efforts include the ongoing research and development for the next generation of Surface Combatants for the 21st Century (DD-21). DD-21 will be tailored for the land attack mission with an emphasis on maritime dominance.

Additionally in FY 2000, the third and fourth San Antonio class amphibious transport dock ships (LPD-17 class) will begin construction. Consistent with the Smart Work initiatives the LPD-17 program is funded to incorporate significant ownership savings. LPD Smart Work initiatives include the Advanced Enclosed Mast system reducing radar cross section, corrosion control for topside and well deck ducting, AAV gun, improved food services, synthetic decking for well deck, smart cards security system, New Emergency Automatic Lighting System battle lanterns, automated inventory tag-out, fresh water cooling, Integrated Condition Assessment System

Chart 8 - Shipbuilding and Conversion Programs

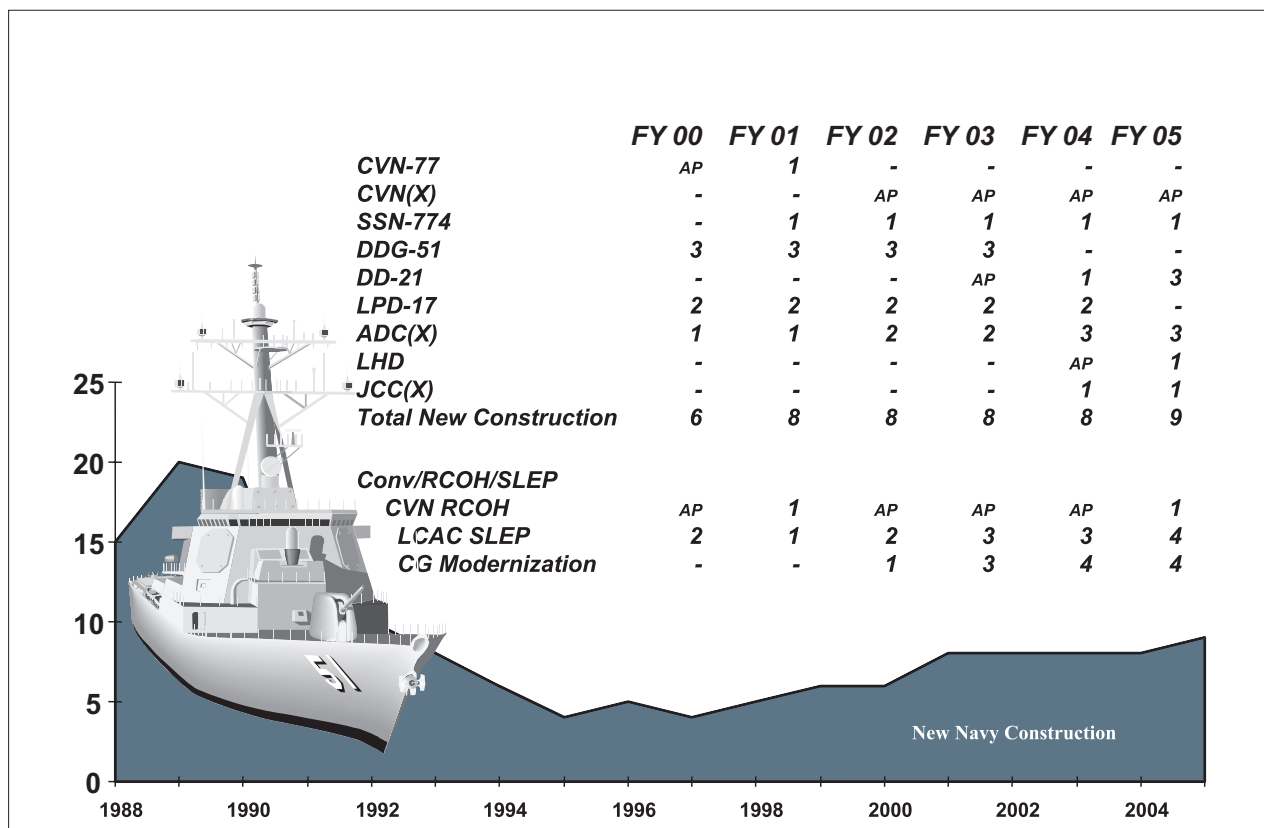


Chart 8 graphically displays new construction ships for FY 2000 through FY 2005 .

enhancements, flat panel displays, diesel engine jacket water stowage, various training equipment improvements, and interactive, virtual, team training courseware enhancements. These enhancements will increase ship and crew readiness, warfighting capability, and reduce overall life cycle costs.

Significant modernization efforts continue in FY 2000. The Cooperative Engagement Capability (CEC) development was restructured to ensure this revolutionary sensor netting technology is fully integrated with today's complex combat systems. CEC R&D funding was increased to provide for additional integration testing with the Aegis Combat System and the Advanced Combat Direction System (ACDS) to ensure full interoperability of these programs. Procurement (OPN) was slowed to minimize risk in FY 2000 pending satisfactory completion of the CEC Operational Evaluation at the end of 2000. FY 1999 reprogrammings into the AEGIS and Combat Systems Integration R&D programs are anticipated to correct emergent software interoperability problems being experienced. The Nulka Anti-Ship Missile Decoy System backfits begin for cruisers, destroyers and amphibious dock landing ships following initial operational testing. The Rolling Airframe Missile (RAM) program continues to mature with procurement of the upgraded Block I missile, providing an enhanced guidance capability along with a helicopter, air and surface (HAS) mode. The Evolved Sea Sparrow Missile (ESSM) program has experienced delays in testing, additional funds are included in this budget to correct them.

Major Surface Weapons Quantities

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
<i>TOMAHAWK</i>	148	176	70	149	200	342
<i>STANDARD</i>	91	112	147	206	252	269
<i>RAM</i>	100	100	155	180	230	205

With approval of the FY 1998 reprogramming for Tactical Tomahawk, the research and development program has been restructured to support the next generation Navy cruise missile, which is intended to provide onboard mission planning and in-flight retargeting. Efforts include simulation and ground testing and weapons system critical design review. In FY 2000 funding has also been added to convert Tomahawk Block IID missiles into the more capable Block IIIC configuration to address emergent Fleet requirements given recent extensive operational usage. FY 2000 also marks the first year of a four-year multiyear procurement contract for the RAM 21-round launcher. The Landing Craft Air Cushioned (LCAC) modernization program increases to two in FY 2000. Modernization includes replacement of the C4N suite and the existing buoyancy box and will extend the design service life of the LCACs to thirty years.

Several land attack warfare R&D efforts are budgeted in FY 2000, including the Extended Range Guided Munition (ERGM), the 5"/62 gun, the Advanced Gun System (AGS) and the Naval Surface Fire Support (NSFS) Integration Capability. ERGM contains an internal Global Positioning System and Inertial Navigation System that

provide state-of-the-art guidance to surface-fired munitions. FY 2000 starts Low Rate Initial Production (LRIP) of ERGM. The 5"/62 gun improves the current 5"/54 gun by lengthening the gun barrel which will allow for an increased number of deliverable munitions. The AGS will provide the next generation of surface combatants with a modular large caliber dual barrel gun system including an automated magazine handling system. The NSFS Integration Capability will use existing fire control infrastructure to serve as the nerve center for surface land attack by automating shipboard land attack battle management duties, incorporating improved land attack weapons systems and utilizing battlefield digitization.

FY 2000 will mark the completion of research and development and initial SCN contract award for one Auxiliary Dry Cargo Carrier (ADC(X)). This ship will serve as the follow-on replenishment ship for the Combat Logistics Force. This ship will provide a badly needed infusion of new technology into the aging Combat Logistics Force.

R&D funding for the Ticonderoga Class Cruiser modernization program continues, to provide selected AEGIS cruisers with Theater Ballistic Missile Defense (TBMD) capability, as well as Area Air Defense Commander capability and improved Naval Surface Fire Support performance.

Over \$35 million was added to the budget in FY 2000 to accelerate Smart Ship technology installations in surface combatants, amphibious ships and aircraft carriers. These smartship technologies include such systems as an integrated bridge system to assist in digital piloting and collision avoidance, and an integrated condition assessment system that automates condition-based maintenance for propulsion and auxiliary equipment. Implementation is critical to reducing overall life cycle cost and reducing at-sea manning requirements.

Also refer to Appendix B for more information:
Shipbuilding and Conversion, Navy
Weapons Procurement, Navy

Table
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Submarine Programs

The submarine force remains the mainstay in the country's ability to covertly project power. This budget reflects continuing commitment to replace aging submarines and modernize remaining ones to ensure the viability of these critical ships. Using a teaming arrangement between General Dynamics, Electric Boat division, and Newport News Shipbuilding Company, construction of the first *Virginia* (SSN-774) class (formerly New SSN) began in 1998. The FY 2000 budget includes funding for advance procurement of materials for the third and fourth hulls of the *Virginia* class, currently planned to commence construction in FY 2001 and FY 2002.

The FY 2000 budget also reflects the Department's strong commitment to incorporating Advanced Technology into the *Virginia* class. Funding in FY 2000 continues the development of advanced technologies such as conformal sonar arrays, advanced sonar processing algorithms, electromagnetic silencing, and advanced propulsion systems. Many of these development efforts will be available for incorporation on some or all of the first four *Virginia* class hulls and will greatly enhance affordability and maintainability of future nuclear attack submarines.

To ensure strategic deterrence, the Navy will buy twelve TRIDENT II (D-5) missiles in FY 2000. The budget reflects the minimum sustaining rate for D-5 missile production and the recent departure of the United Kingdom from the joint procurement program. Funding for the Trident programs also reflects significant investments in total ownership cost reduction initiatives. Specific efforts will reduce ownership costs for fire control and navigation equipment for Trident SSBN's.

Major Surface Weapons Quantities

	<i>FY 2000</i>	<i>FY 2001</i>	<i>FY 2002</i>	<i>FY 2003</i>	<i>FY 2004</i>	<i>FY 2005</i>
<i>TRIDENT II</i>	12	12	12	12	12	5
<i>TOMAHAWK</i>	148	176	70	149	200	342

The FY 2000 budget funds needed upgrades to submarine communication suites. The budget continues the procurement of High Data Rate antennas, improved multi-function antennas, and several radio room automation improvements to increase the throughput and flexibility of submarine radio rooms. These capabilities will provide greater flexibility and increase the utility of the country's submarine assets.

Also refer to Appendix B for more information:
Shipbuilding and Conversion, Navy
Weapons Procurement, Navy

Table
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ANTI-SUBMARINE WARFARE

Over the FYDP, the DoN has budgeted over \$4.0B in RDT&E,N and \$8.7B in procurement for specific ASW programs. Key Science & Technology (S&T) initiatives include improving exploitation of passive acoustic broadband and narrowband information for rapid attack, improving performance of multi-static active systems, pursuing recent advancements in non-acoustic technologies such as automated radar periscope detection and discrimination, developing long-term cooperative relationships between U.S. agencies and allies, and developing concepts of operations for ASW C4ISR. AN/SQQ-89(V) modernization and other improvements to Surface Ship Sonar Systems are continuing. The FY 2000 budget continues the full rate production of towed array processing units and begins full-scale production of spherical array processing units. Installation of commercial off-the-shelf (COTS) computer technology, the Acoustic Rapid COTS Insertion (A-RCI) program, continues into submarines. These units, which provide upgraded towed array processing, are currently undergoing at-sea testing which has validated the Navy's decision to pursue the use of commercially available technology. The FY 2000 budget continues the full rate production of towed array processing units and begins full-scale production of spherical array processing units. The Department also begins procuring the TB-29 towed array in FY 2000 providing significant improvement in search and detection capability. In addition to specific ASW funding, another \$28.2B will be invested across the FYDP to procure and modernize ASW-capable, multi-mission platforms such as SSN-21, NSSN, DDG 51 Flight II, DD 21, P-3, and SH-60R.



AVIATION PROGRAMS

The FY 2000 budget provides for procurement of 105 aircraft as part of the Department's plan to maintain qualitative superiority of the Navy and Marine Corps team into the next century. In an effort to maximize use of procurement dollars, the FY 2000 budget requests the establishment of a multiyear procurement (MYP) of the F/A-18E/F which will generate over \$700 million dollars in savings through the FYDP. Other multiyear procurement programs that continue through the FYDP include E-2C, AV-8B, and CH-60. Recapitalization of Reserve aircraft commences in FY 2000 with two additional CH-60 helicopters and one C-40A transport aircraft. Additionally, the Department has made several investments in Smart Work initiatives, which affect programs such as the V-22, H-60, S-3, and Automatic Test Equipment. These investments are expected to save labor costs, producing significant operating and support cost savings budgeted over the FYDP.

The F/A-18E/F and V-22 are the newest additions to the Navy and Marine Corps team's ability to project power from the sea. These programs will begin Full Rate Production in FY 2000 and FY 2001, respectively, upon completion of their Operational Evaluation

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(OPEVAL). Increased funding is also budgeted for procurement of initial spares to support IOC of F/A-18E/F and MV-22. Funding in FY 2000 also supports the procurement of key elements of the helicopter master plan. Following an

anticipated FY 1999 reprogramming from CH-60 procurement to R&D to fully fund the refined cost estimate for the development program, CH-60 procurement will continue a low rate initial production (LRIP) buy in FY 2000 as part of the Army's MYP, then ramp up to full production upon completion of OPEVAL. Research and Development funding continues in FY 2000 to support the SH-60R remanufacture. Remanufacture of SH-60R commences in FY 2000 and will improve the SH-60's capability to provide battle group protection, particularly in the littoral environment. The scope of the remanufacture includes avionics upgrades as well as a Service Life Extension and standard depot level maintenance. Remanufacture of the SH-60 is also an LRIP buy. Funding in FY 2000 also supports continued research and development of the EA-6B Improved Capability (ICAP III) program which will provide the aircraft with a new selective re-active receiver with integrated communications, jamming, and connectivity capabilities. Additionally, FY 2000 R&D funds are budgeted for the 4BN/4BW program. The 4BN/4BW program will provide an improved capability to Marine Corps light/utility and attack helicopters (including items such as improved payload, common range, improved sensors, lethality and increased time on station), with FY 2000 RDT&E funds completing the assembly and fabrication of the engineering and manufacturing development aircraft. Other major R&D programs include the shared reconnaissance pod (SHARP) and active electronically scanned array (AESA) radar for the F/A-18E/F.

Joint aircraft weapons systems programs also continue to be an important component of Navy weapons systems acquisition strategy in FY 2000. Initial procurement of the T6-A JPATS begins in FY 2000. The T-6A is a commercially derived aircraft combined with a ground based training system which will provide primary and intermediate flight training to entry-level student naval aviators and naval flight officers. Additionally, funding in FY 2000 continues the development efforts and the fabrication/assembly of the special operations variant of the V-22. Joint Strike Fighter efforts in FY 2000 continue concept demonstration and technology maturation, demonstration and assessment.

Aircraft modification funding provides for safety and tactical upgrades throughout naval aviation. Specific efforts include the installation of an integrated maintenance diagnostics system (IMDS) in H-60 series helicopters, structural improvements and upgrades to the EA-6B which include a new wing center section to increase aircraft life; training equipment necessary for the SH-60B Forward Looking Infrared Radar (FLIR); F/A-18 radar upgrade and structural and safety improvements, as well as development of the Generation III Targeting Forward Looking Infrared Radar; the P-3 Service Life Assessment/ Extension Program, Anti-Surface Warfare Improvement Program efforts, Update III Common Configuration program and Sustained Readiness Program; and upgrades to tactical aircraft electronic warfare countermeasures capabilities. The installation of

Chart 9 - Aircraft Programs

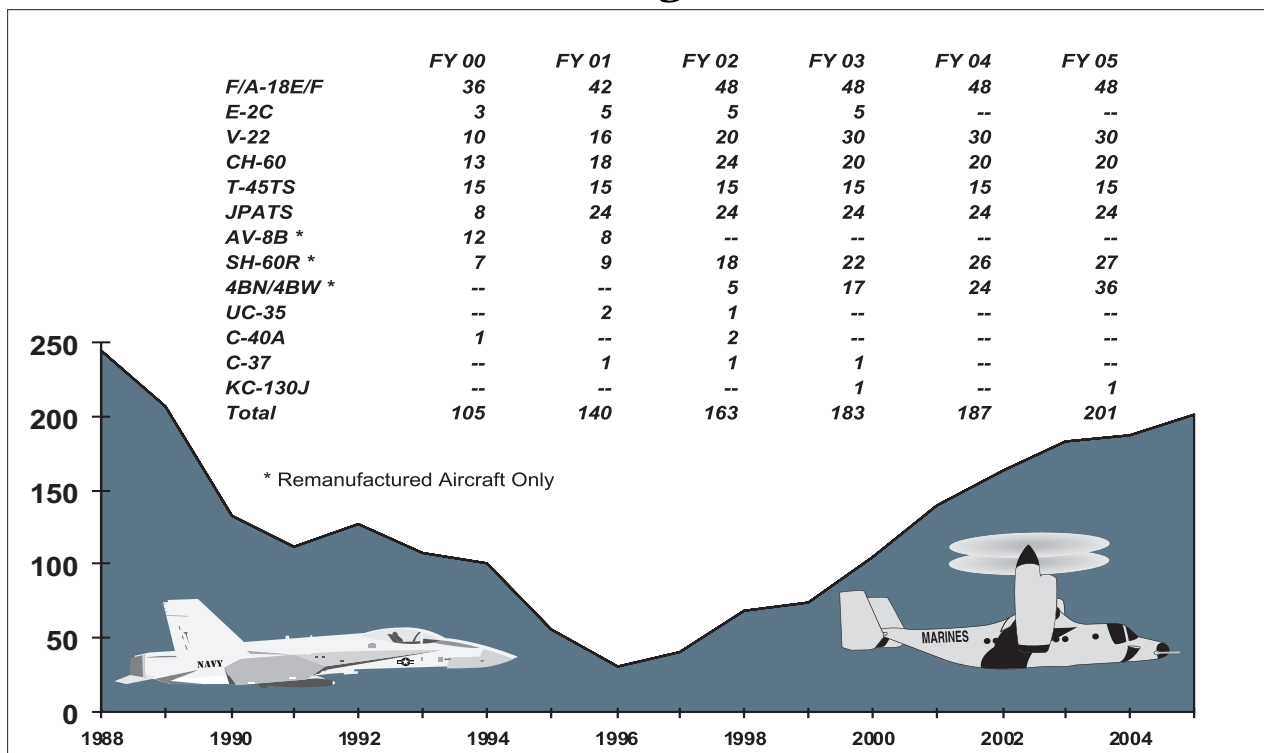


Chart 9 graphically displays the Department's new production and remanufactured aircraft programs.

IMDS in legacy aircraft is the first major step in Smart Work initiatives which will reduce ownership cost of rotary aircraft. The IMDS will provide for improved usage monitoring which will allow for more accurate maintenance and a corresponding decrease in non-revenue producing flights as well as a decrease in AVDLR requirements.

The Advanced Anti-Radiation Guided Missile (AARGM) technical demonstration program focuses on completion of control test vehicle flight testing and commences Live Fire testing. Naval Tactical Unmanned Aerial Vehicles (UAV) efforts will center on using Tactical UAV funding recently transferred from DARO. This will support Vertical Take-Off and Landing (VTOL) technology to affordably meet Navy UAV requirements including range, endurance, and full operational effectiveness from all air capable ships and small areas ashore. Also funded is a Smart Work initiative to reduce ownership costs for the SLAM/SLAM-ER/Harpoon missile test sets by decreasing maintenance.

Major Aviation Weapons Quantities

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
AMRAAM	100	100	100	100	100	100
JSOW	615	636	748	775	785	584
SLAM-ER	56	38	38	38	38	38
ESSM	—	31	87	165	147	152
AIM-9X	75	125	300	300	300	300

The AIM-9X Sidewinder begins procurement in FY 2000 and will significantly improve Navy/Air Force short-range air-to-air missile capability required to counter existing foreign threats. FY 2000 is also the first year of Navy procurement of the Joint Stand-Off Weapon (JSOW) BLU-108 variant which provides the Navy/Air Force with the most advanced stand-off, anti-armor capability available through incorporation of Sensor Fused Weapons technology. JSOW Unitary Variant continues efforts in FY 2000 associated with replacing the man-in-the-loop feature with Autonomous Target Acquisition to provide the Fleet with an effective and affordable Standoff Outside Point Defense capability. FY 2000 marks the first year of Joint Direct Attack Munition (JDAM) full rate production. This munition will answer the need identified during Operation Desert Storm for a more accurate weapon delivery capability in adverse weather conditions and from medium and high altitudes.

Also refer to Appendix B for more information:
Aircraft Procurement, Navy
Weapons Procurement, Navy

Table
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MINE WARFARE

Mine warfare remains a critical element of the DON's modernization program. In keeping with the Department's emphasis on organic mine warfare programs, a shift of \$7.5 million from procurement to R&D in FY 1999 is anticipated to resolve technical problems in the Remote Minehunting System (RMS) development program. R&D funding to incorporate the RMS on non SQQ-89 platforms is budgeted in FY 2000. Additionally, the FY 2000 budget includes funding to accelerate development and fielding of several next generation Organic

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Airborne Mine Countermeasure (AMCM) systems including the Airborne Laser Mine Detection System (ALMDS), the Airborne Mine Neutralization System (AMNS), and the Rapid Airborne Mine Clearance System (RAMICS), Advanced Deployable System (ADS) and the Shallow Water Breaching Systems/Distributed Explosive Technology (SABRE/DET). Funding is also provided for the development of a single common console for all Organic AMCM systems. This action reflects the Navy's intent to establish a mid-term organic mine warfare capability that is fully integrated on the H-60 helicopter. Across the FYDP, the budget includes an additional \$317 million in support of expanded Mine Warfare efforts.

C⁴I PROGRAMS

The central theme shaping the budget for Navy Command, Control, Communication, Computers and Intelligence (C⁴I) programs is the concept of Information Technology for the 21st Century (IT-21). IT-21 will provide the common backbone for internettted communications, command, control, computers and intelligence systems. The C⁴I evolutionary plan revolves around four key elements: connectivity; a common tactical picture; a sensor-to-shooter emphasis; and information/command and control warfare. Increased funding in FY 2000 accelerates network connectivity efforts, installing ATM LAN and SATCOM terminals to support network centric warfare capability for deploying battle groups. Smart Work initiatives have been added to the communication and electronics items under \$5 million program, which will result in reduced production and operation and support costs.

The principal elements to provide connectivity are Asynchronous Transfer Mode (ATM) local area networks (LANs) afloat and local and regional networks ashore. These networks integrate tactical and tactical support applications afloat with connections to enhanced satellite systems and ashore networks. Funding is increased for Ship Communications Automation for procurement of LANs and the

... qualitative superiority in warfighting capabilities

Automated Digital Network System providing ship and shore and satellite connectivity; Global Command and Control System-Maritime (GCCS-M) Afloat software providing the

common tactical picture; the Naval Shore Communications providing connection to Defense Information Systems Network (DISN) through Navy Switch and Cable Plant Modernization Plan (NASCAMP); and the Information System Security Program (ISSP) providing network security.

IT-21 connectivity is critical because it provides the managed bandwidth for timely transmission of information. Increased support for Satellite Communications continues expansion of available bandwidth to the warfighter. Joint UHF MILSATCOM Network Integrated Control System will be completely procured and installed by FY 2004. Funding increases in FY 2000 for Digital Modular Radio (DMR), SHF terminals, EHF Medium Data Rate (MDR) enhancements, Challenge Athena and Global Broadcast System (GBS), which exploit multiplexing techniques, direct satellite broadcast and wideband transmission systems while capitalizing on commercial advancements.

Sensor-to-Shooter focuses on the process of putting a weapon on target. Funding continues in FY 2000 for Advanced Tactical Data Links (ATDLS) and Common High Bandwidth Data Link (CHBDL) to ensure timely transmission of surveillance, targeting, engagement, combat identification, and battle damage assessment information over IT-21 networks. Over half of the CHBDL systems will be procured by FY 2000, guaranteeing full operating capability by the end of the FYDP. ATDLS is the system for implementing compliance with the OSD direction to have 75% of all units Link-16 compatible by FY 2005.

Information Warfare/Command and Control Warfare (IW/C2W) is the integrated use of operations security, military deception, psychological operations, electronic warfare and physical destruction to deny information to, influence, degrade or destroy an adversary's C2 capabilities, while protecting friendly C2 capabilities against such actions. FY 2000 funding is increased for Outboard and Combat Directional Finder budgeted under Shipboard Cryptologic Systems, and the Information System Security Program within IT-21

Also refer to Appendix B for more information:

Other Procurement, Navy
Procurement Marine Corps

Table

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MARINE CORPS GROUND EQUIPMENT

Consistent with the Quadrennial Defense Review and the United States Marine Corps (USMC) overarching philosophy of modernization and recapitalization, the FY 2000 budget continues to focus on the development and procurement of technologies and systems that support making better Marines and winning battles. As part of the Administration's Defense Initiative, the Department has increased procurement funding in this category to a level of almost \$1.3 billion for FY 2000.

The upward trend in the pace of modernization continues through the FYDP. Several major replacement, remanufacture and modernization programs are included in this budget, such as the Medium Tactical Vehicle Replacement (MTVR) and the Assault Amphibious Vehicle (AAV) Reliability, Availability, and Maintainability /Rebuild to Standard (RAM/RS) program. Also, this budget provides for the accelerated procurement of High Mobility Multi-purpose Wheeled Vehicles (HMMWVA2s) that will update the current aging inventory. The FY 2000

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budget also funds the continuation of the AAV7A1 RAM/RS program to provide a cost-effective method to sufficiently bridge operational requirements until the Advanced Amphibious Assault Vehicle (AAAV) replaces the AAV7A1. The continued multiyear procurement of the Javelin Missile, a medium range, man-portable, anti-tank weapon to replace the Dragon system is also provided for in the FY 2000 budget.

Major Marine Corps Ground Equipment

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
MTVR	788	1,961	1,948	1,933	--	--
HMMWVA2	2,078	1,267	2,352	2,297	2,398	3,455
LW155	--	--	70	120	170	90
Javelin	954	337	--	--	--	--
Predator	--	442	647	781	1,909	2,126

The FY 2000 budget for ammunition continues the effort to reach the Marine Corps goal of satisfying the Combat Requirement through the FYDP while meeting the annual ammunition training requirements.

Significant resources in the FY 2000 Research and Development budget are dedicated to the AAAV, which will replace the twenty year old Assault Amphibious Vehicle. Smart Work initiatives have been budgeted in the AAAV program which are designed to reduce the production and operational support costs by providing engine producability enhancements and design simplifications. Also continuing in FY 2000 is the development of the Short-Range Anti-Armor Weapon (Predator), a lightweight, disposable, main battle



tank killer. Development, prototyping and engineering efforts also continue for the Lightweight (LW) 155mm Howitzer, a replacement for the aging, operationally deficient M198 howitzer. The LW155 will provide fire support with increased mobility, survivability, deployability and sustainability in an expeditionary environment.

The FY 2000 RDT&E budget continues to finance the Marine Corps led experimentation with future tactics, concepts and innovations involving both Marine and Navy forces. The Marine Corps Warfighting Laboratory is the centerpiece for operational reform in the Corps, investigating new and potential technologies and evaluating their impact on how the Marine Corps organizes, equips and trains to fight in the future. Additionally, as the DoD Executive Agent for Non-lethal Weapons (NLW), the budget continues to finance NLW research and development. In FY 2000, increased efforts have been budgeted in exploring acoustics as an anti-personnel NLW system with an overall objective of producing a non-lethal, tunable, incapacitating high power acoustic weapons system.

Also refer to Appendix B for more information:
 Procurement, Marine Corps
 Procurement of Ammunition, Navy and Marine Corps

Table
 B-15
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RESEARCH AND DEVELOPMENT SUPPORT

The Department's Science and Technology program sustains U.S. Naval superiority by providing new concepts and technological options and the means to exploit scientific breakthroughs. The program supports high risk, high payoff technologies that could significantly improve the warfighting capabilities of naval forces not currently under development or deployed in the Fleet and Fleet Marine Forces. Science and Technology funding in FY 2000 generally remains at the FY 1999 President's Budget level.

The Basic Research program seeks to increase knowledge and understanding across the full spectrum of long-term Department of the Navy needs. Research is conducted to ensure that both cutting-edge scientific discoveries and the general store of scientific knowledge are optimally used to develop superior naval equipment, strategies, and tactics. The FY 2000 budget increases Basic Research funding by 2.3 percent, excluding inflation, over the FY 1999 President's Budget level. While a portion of these funds support in-house efforts, the majority support university and other researchers in the areas of ocean sciences, advanced materials, and information systems.

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Applied Research and Advanced Technology Development efforts include initiatives focused toward the solution of specific naval problems, short of major development projects. Technology demonstrations reflect the naval focus to transition near-term, risk-reducing and emerging technologies to operational Fleet units faster and at less total cost than traditional development programs. Special focus areas for FY 2000 Applied Research include: Extending the Littoral Battlespace; use of unmanned underwater vehicles (UUVs) for explosive ordnance detection; and oceanographic influences on mine countermeasure systems.

Advanced Technology Development programs focus on demonstrating technologies in those same key Naval technology areas, as well as manpower and medical applications. The majority of these funds are spent on actual pilot projects and test beds which demonstrate advanced technology capabilities applicable to meeting requirements. Such efforts include demonstrating: new ship propulsion systems, advanced weapons technologies, cutting edge technology for aircraft and weapons integration, logistics deployment techniques and technologies, state-of-the art mine and expeditionary warfare technologies such as those developed at the Marine Corps Warfighting Laboratory, and advanced battlefield casualty assessment and treatments. Particular areas of focus in FY 2000 for Advanced Technology include: automation to reduce manning for future ships; Cruise Missile Defense; Marine Corps expansion of warfighting

experimentation; and development and demonstration of mine warfare technology. If successful, these demonstrations will transition into full scale development programs or directly into the Fleet if no further development is required.

RDT&E Management Support provides funding for installations required for general research and development use. These efforts include the test and evaluation support programs required to operate the Navy's test range sites, R&D aircraft and ship funding, and threat simulator development efforts. This funding level reflects required R&D infrastructure support commensurate with overall Navy force structure and facilities and management consolidations. Seventy-five percent of this funding, or about \$487 million in FY 2000, supports the Major Range and Test Facilities Base (MRTFB), necessary to conduct independent test and evaluation assessments for all Navy ship, submarine, aircraft, weapons, combat systems and other development, acquisition and operational system improvements. Increases over the FY 1999 level are required to support major modernization of test range radars and instrumentation, and avionics instrumentation systems at the sea and land test ranges to support testing of upcoming major development programs such as the Joint Strike Fighter, SLAM-ER, and the F/A-18 Integrated Defensive Electronic Countermeasure (IDECM) System.

The remaining categories of research are platform-related and have been discussed as applicable in the previous sections. Table 13 provides summary data for the major DON Research, Development, Test and Evaluation, efforts.

Table 13
Department of the Navy
Research, Development, Test and Evaluation
(In Millions of Dollars)

Significant RDT&EN Areas	FY 1998	FY 1999	FY 2000
Operational Systems Development	1,517.4	1,932.4	1,877.5
Science and Technology	1,317.4	1,521.5	1,420.0
Basic Research	(331.4)	(361.5)	(376.7)
Applied Research	(467.4)	(566.8)	(523.8)
Advanced Technology Development (ATD)	(518.6)	(593.2)	(519.5)
RDT&E Management Support	677.6	598.7	646.5
Joint Experimentation	0	15.9	42.4
Major Platform Efforts:			
F/A-18	288.7	302.0	315.7
New Attack Submarine	382.3	311.1	280.6
Joint Strike Fighter	448.2	468.5	241.2
C4I	238.5	314.3	254.9
CVX	15.0	104.4	205.5
V-22	487.6	345.8	182.9
4BN/4BW	81.3	120.3	157.7
TOMAHAWK	107.0	165.7	147.2
DD-21	58.5	126.0	162.1
Cooperative Engagement Capability	200.5	200.6	114.9

Also refer to Appendix B for more information:
 Research, Development, Test and Evaluation, Navy

Table
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